

SoS/Interoperability IPT

Integrating Lockheed Martin Strengths ...Realizing Military Value

Harnessing Technology for C4ISTAR Operations

Capability & Architecture-Based Improvement Process

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24 September 2002

maintaining the data needed, and of including suggestions for reducing	llection of information is estimated to completing and reviewing the collect this burden, to Washington Headqu uld be aware that notwithstanding ar OMB control number.	ion of information. Send comments arters Services, Directorate for Information	regarding this burden estimate mation Operations and Reports	or any other aspect of th , 1215 Jefferson Davis l	is collection of information, Highway, Suite 1204, Arlington	
1. REPORT DATE 23 AUG 2004		2. REPORT TYPE N/A		3. DATES COVERED		
4. TITLE AND SUBTITLE				5a. CONTRACT NUMBER		
Harnessing Technology for C4ISTAR Operations Capability & Architecture-Based Improvement Process				5b. GRANT NUMBER		
Architecture-Dascu improvement i rocess				5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)				5d. PROJECT NUMBER		
				5e. TASK NUMBER		
				5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Network Centric Systems				8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)		
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAIL Approved for publ	LABILITY STATEMENT ic release, distributi	on unlimited				
	OTES 11 Meeting C4ISTA ginal document cont	-	nplementing and	Exploiting T	'echnology	
14. ABSTRACT						
15. SUBJECT TERMS						
16. SECURITY CLASSIFIC	17. LIMITATION OF	18. NUMBER	19a. NAME OF			
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	- ABSTRACT UU	OF PAGES 21	RESPONSIBLE PERSON	

Report Documentation Page

Form Approved OMB No. 0704-0188

Sharing Insights About Improving C4ISTAR Operations



Warfighting Experience: Powerful Solutions, Often Process-Oriented, Put Quickly Into Place; Solutions Tend to be Specific & Not Institutionalized

Experimentation: Excellent, But Expensive; Improvement Injected Without Formal Controls

Underexplored Capability-Based Architecture: The 'Right Way', But Very Hard, & Results May be Long in Coming

Process Focus: Pick an Information Thread, Discover & Drive Out Waste

This Brief Starts With Capabilities & Architectures & Closes With a Lean Information Process Focus

Capability ... Everyone's Talking About

CAPABILITIES-BASED REVIEWS BEGIN TO BEAR FRUIT, ROCHE SAYS ...

The Capabilities Review and Risk Assessment process aims to let

capabilities, not specific weapons systems, drive how the Air Force spends its money. *

Capability ... Everyone's Talking About It

"How is it that we can tie capabilities to the budget process? Right now, they're kind of divorced because my CONOPS looks at problems, effects and capabilities and my POM looks at programs and systems." **

** Col. Gary Crowder, chief of strategy, concepts, and doctrine at Air Combat Command; quoted in INSIDE THE AIR FORCE, September 6, 2002b

Alignment...

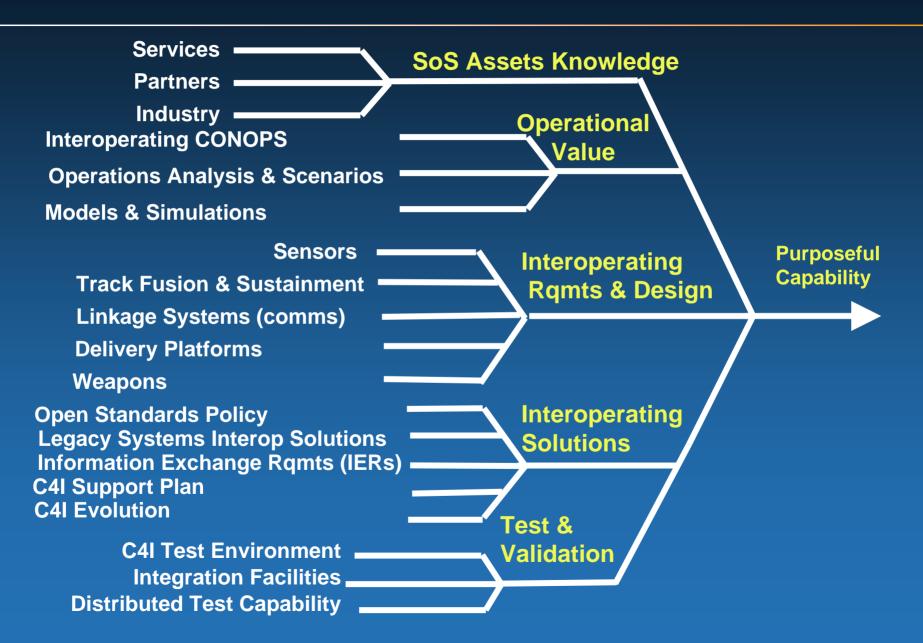


- Capability for This Presentation Means...
 - Improved Effectiveness of Locating Mines in Surf
 - Effective Attack Against Time Critical Targets
 - ...
- A Capability is Characterized By...
 - An Operational Architecture...Commander's Intent
 - Process Architecture...Who Does What When
 - An Information Architecture... Supports The Process
 - Conforming Components...The Implementing Agents & Actors
- Capability Solutions Are Threads Linking Conforming Components Into an Operational Whole
 Multiple Solutions Are A

Characteristic of Capabilities

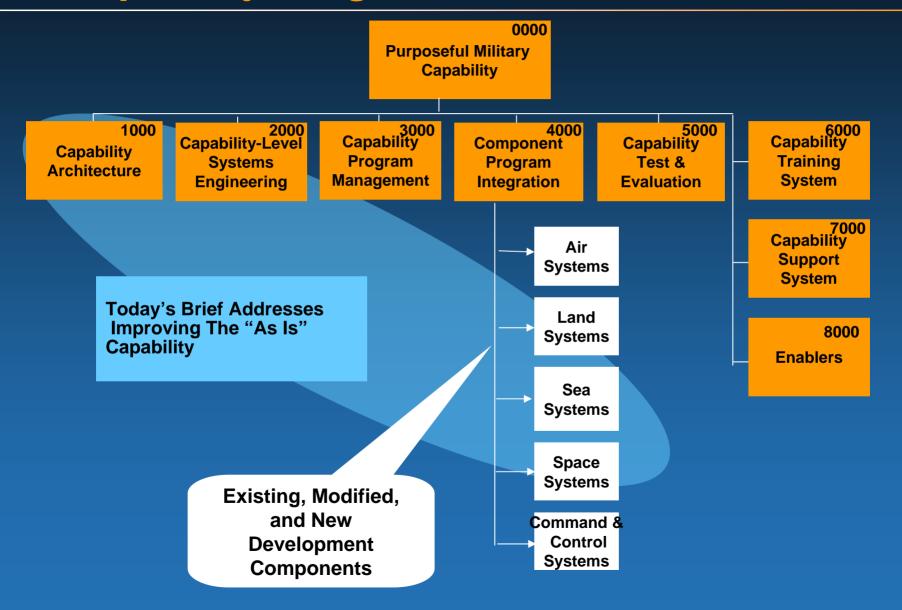
Components of a Capability





Work Breakdown Template for a Capability Program





Architecture ... Everyone's Talking About It ...

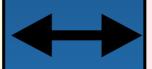






Identifies Players, Relationships, and Information Needs





Technical View

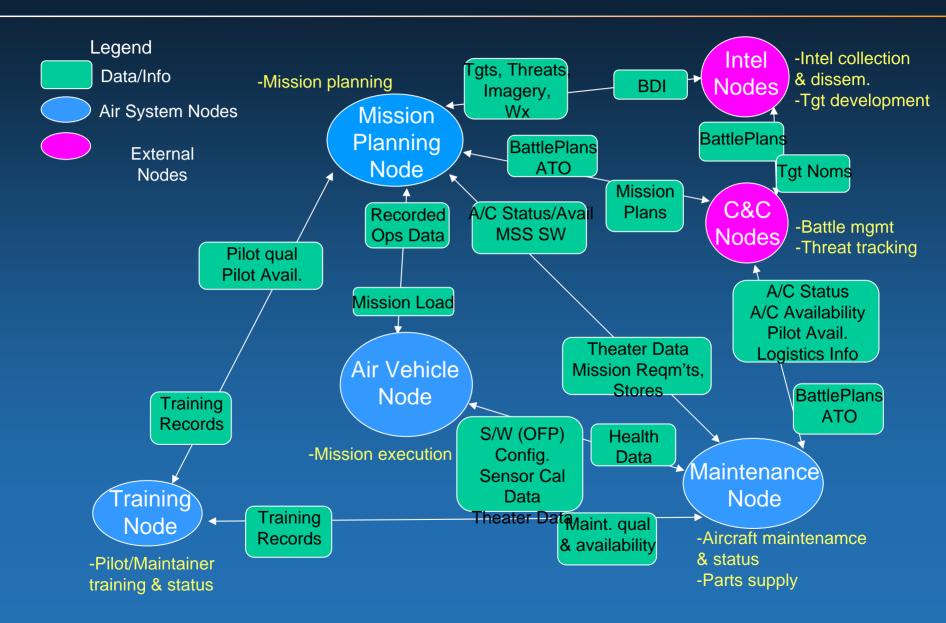
Relates Capabilities and Characteristics to Operational Requirements

Prescribes Standards and Conventions

Example: Aircraft Ground Turn-around Thread



Operational View - 2 (Operational Node Connectivity Diagram)

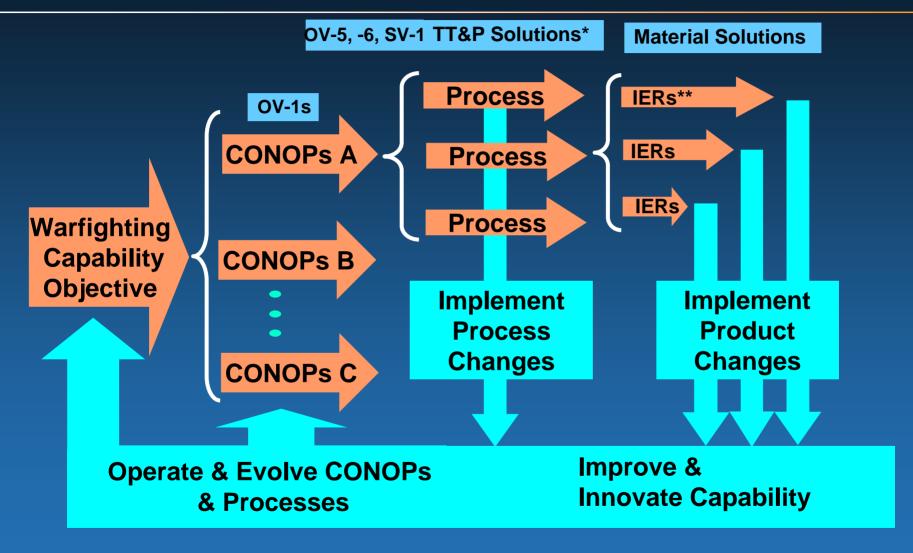




Using Architecture-based Capability Descriptions to Identify C4ISTAR Operations Improvements

Improvements Opportunities Emerge At Several Levels





*TT&P: Tactics, Techniques & Procedures

**IERs: Information Exchange Requirements

Observations on Architecture & Implementation



- Focus of Acquisition Is Nodes & Entities
 - Well-documented Requirements
 - Managed Change Processes
- Focus of Joint Operations Requires Nodes and Entities to Purposefully Interoperate
 - Within The Context of a Process (Conops)
 - Tactics, Training & Procedures Reflect Process Specifics
- Operational Performance Today Often Constrained by Process & Interoperability
 - Process Fulfillment Time Often the Dominant Factor

Even New-Wave Architectures Will Be Strongly Constrained by Legacy Force Elements

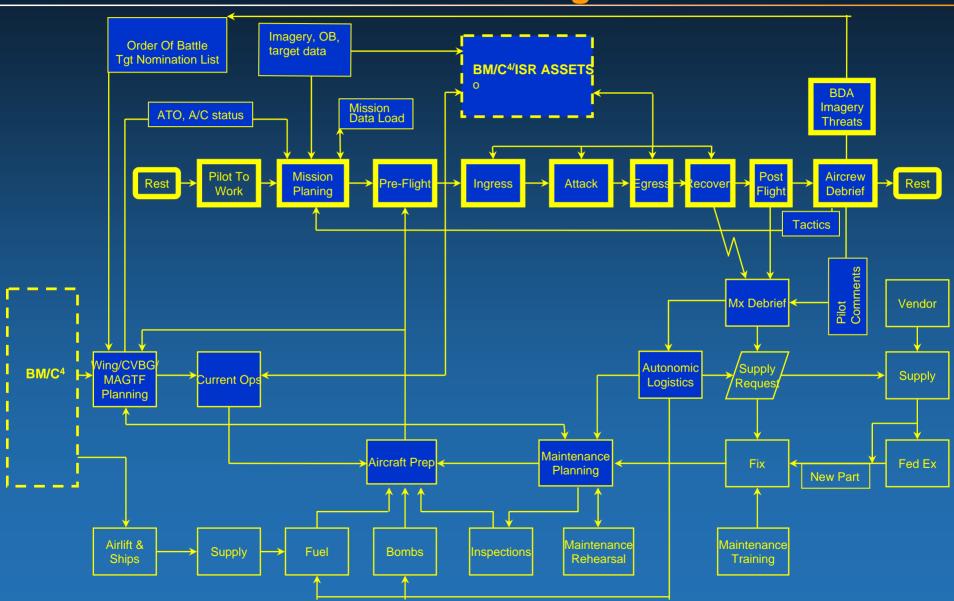
So How Do We Improve C4ISTAR Operations??



During JEFX wargaming, the time-critical targeting process was reduced to "less than thirty minutes" Key to this reduction was the existence of enhanced machine-to-machine interfaces among applications in the CAOC... Greater integration of all applications ... cuts down on the use of the so-called "sneaker-net," when "an operator has to ...create a database on one machine, save it to a floppy disk, go over to another machine and pop the floppy disk in." *

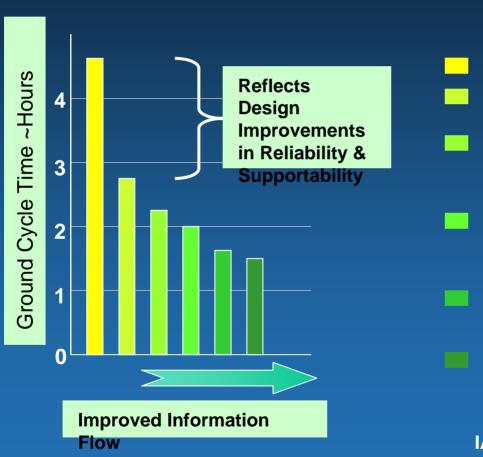
Closing the Execution Loop in A Combat Air Mission Setting





Improved Information Flow Reduces Ground Cycle Time





- Legacy Fighter, Legacy IA
- Next Gen Fighter with Legacy IA
- + pre/post-flight data transfers,routine acts, missioniz'g, load'g
- + reliability, abort freq'y/repair,Mx frequency, Mx actions
- + a/c disposition decisions, maintenance-data transfers
- + parts delays

IA--Information Architecture

Lean Thinking (Womack and Jones)



- Precisely specify value by specific product capability
- Identify the value stream for each product capability
- Make value flow without interruptions
- Let the customer pull value from the producer
- Pursue perfection

Example Today: Improving Sortie Generation
Through Improved Maintenance Information Flows

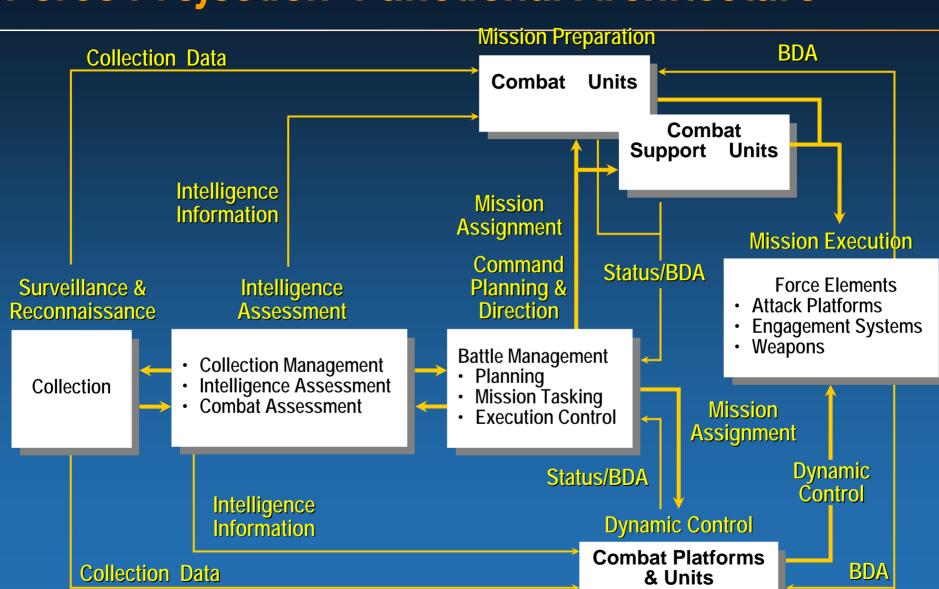
Process Improvement Focus What to Look For



Seven Information System Wastes

- 1. Over Production---Data Overload
- 2. Uncontrolled Inventory---Old Data; Difficult Retrieval
- 3. Information Exchange---Non-Interoperable Issues
- 4. Unnecessary Movement—Reformatting; Indirect Access
- 5. Waiting---Delivery Not Timely
- 6. Defective---Incomplete, Incorrect
- 7. Inefficient Processing---Custom: Redundant

Force Projection Functional Architecture

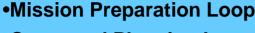


Mission Flow

BDA – Battle Damage Assessment 11901-02

C4ISTAR Capability Loops Are Embedded in The Functional Architecture

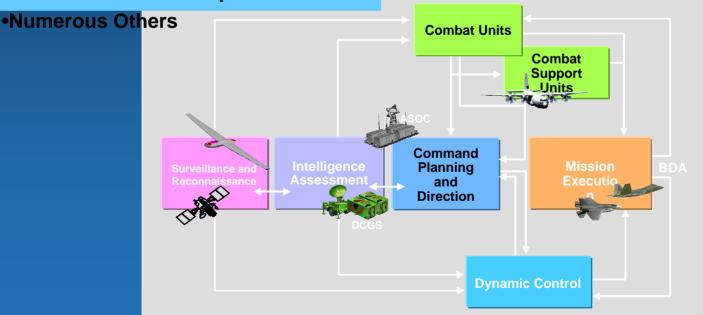
Example



- Command Planning Loop
- •Real-Time Remote-Sensing Support to

Mission Execution

- Battle Damage Assessment Loop
- Time-Sensitive Targeting Loop
- Sortie Generation Loop



Improvements Process

1

- Chose Something Specific to Improve
 - Settle On An Improvement Measure
- Establish the "As Is" Information Architecture
 - Use The Architecture Framework: Assures
 Completeness, Consistency
 - Use Lean Information Systems Principles to Identify Improvement Candidates
- Do The CAIV Trades
 - Process Models Can be Very Helpful
- Implement & Verify

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Warfighting Experience: Powerful Solutions,
Often Process-Oriented Put Quickly Into
Place; Solutions Tend to be Specific & Not
Institutionalized

Experimentation: Excellent, But Expensive; Improvement Injected Without Formal Controls

Under-explored

Capability-Based Architecture: The 'Right', But Very Hard, & Results May be Long in Coming

Process Focus: Pick an Information Thread,
Disco An Alternative That Can Proceed in Parallel
With Other Improvement Activities